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IRVINE, CA 92614			1763	

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Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/824,798

**Applicant(s)**

SHINRIKI ET AL.

**Examiner**

Rudy Zervigon

**Art Unit**

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 07 October 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-40 is/are pending in the application.
- 4a) Of the above claim(s) 21-29 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 and 30-40 is/are rejected.
- 7) ☒ Claim(s) 18 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 April 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 4/15/2004.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election of Group I, claims 1-12 in the reply filed on October 7, 2005 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

### ***Drawings***

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "gas-distribution head", "head surface", "first plate", "second plate", "connectors", "first bores", "second bores", "third bores" must be shown or the features canceled from the claims. No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet"

Art Unit: 1763

pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Objections***

3. Claim 18 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claims, or amend the claims to place the claims in proper dependent form, or rewrite the claims in independent form.

***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 30-40 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claims contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Applicant's claimed "first bores", "second bores", "third bores" is nowhere discussed in the specification as filed.

6. Claim 16 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which

Art Unit: 1763

it is most nearly connected, to make and/or use the invention. Applicant's claimed "PR power" is a term unfamiliar in the art.

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 1-20, and 30-40 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 1 requires "said first and said second sections being isolated from each other in the gas-distribution head". It is uncertain how the sections are "isolated". Isolated thermally, electrically, or isolated from gas mixing?

9. Claim 6 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 6 requires "without being communicated with each other". It is uncertain how the sections are "communicated". Communicated thermally, electrically, or isolated from gas mixing? Claim 6 further requires "first section reaches the head surface through the second section without being communicated with each other". How can a "section", as a structural component, "reach" another section? The Examiner interprets the requirement as the gas from the first section...

10. Claims 1-20, and 30-40 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: The drawings do not show Applicant's "head surface". As a result, the claim 2 requirement of "first section and the second section are each

Art Unit: 1763

disposed parallel to the head surface” is impossible to ascertain structurally until Applicant amends the drawings as directed above. Additional claims have similar problems when citing “head surface”.

11. Claim 4 recites the limitation “the respective exhaust systems”. There is insufficient antecedent basis for this limitation in the claim.

12. Claim 20 recites the limitation “the exhaust system for evacuating the gas-distribution head”, and “the exhaust system for evacuating the space between the head surface and the support”. There is insufficient antecedent basis for these limitations in the claim.

13. Claims 11, 40 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicant’s “longitudinal shape” is indefinite. What is the shape of a “longitude”?

***Claim Rejections - 35 USC § 102***

14. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

15. Claims 1-4, 6, 7, 9-11, 17-19, 30, 32-37, and 40 are rejected under 35 U.S.C. 102(b) as being anticipated by Okase; Wataru (US 5884009 A). Okase teaches a gas-feeding apparatus (Figure 9; column 17, line 55 - column 18, line 41) configured to be connected to an evacuable reaction chamber (8; Figure 9; column 17, line 55 - column 18, line 41) provided with a support (81; Figure 9; column 17, line 55 - column 18, line 41) for placing a substrate (“W”; Figure 9; column 17, line 55 - column 18, line 41) thereon, comprising: a gas-distribution head (9a-c, 85a;

Art Unit: 1763

Figure 9; column 17, line 55 - column 18, line 41) for introducing gases into the chamber (8; Figure 9; column 17, line 55 - column 18, line 41) through a head surface (9; Figure 9; column 17, line 55 - column 18, line 41), comprising a first section (9a-c; Figure 9; column 17, line 55 - column 18, line 41) for discharging a gas through the head surface (9; Figure 9; column 17, line 55 - column 18, line 41) toward the support (81; Figure 9; column 17, line 55 - column 18, line 41) and a second section (85a; Figure 9; column 17, line 55 - column 18, line 41) for discharging a gas through the head surface (9; Figure 9; column 17, line 55 - column 18, line 41) toward the support (81; Figure 9; column 17, line 55 - column 18, line 41), said first and said second sections (9a-c, 85a; Figure 9; column 17, line 55 - column 18, line 41) being isolated from each other in the gas-distribution head (9a-c, 85a; Figure 9; column 17, line 55 - column 18, line 41), at least one (85a) of which section is coupled to an exhaust system (46, 47; Figure 9; column 17, line 55 - column 18, line 41) for purging therefrom a gas present in the corresponding section without passing through the head surface (9; Figure 9; column 17, line 55 - column 18, line 41), as claimed by claim 1

- i. The gas-feeding apparatus (Figure 9; column 17, line 55 - column 18, line 41) according to claim 1, wherein the first section (9a-c; Figure 9; column 17, line 55 - column 18, line 41) and the second section (85a; Figure 9; column 17, line 55 - column 18, line 41) are each disposed parallel to the head surface (9; Figure 9; column 17, line 55 - column 18, line 41), said second section (85a; Figure 9; column 17, line 55 - column 18, line 41) being closer to the head surface (9; Figure 9; column 17, line 55 - column 18, line 41) than is the first section (9a-c; Figure 9; column 17, line 55 - column 18, line 41), wherein at least the first section (9a-c; Figure 9; column 17, line 55 - column 18, line 41) is

coupled to the exhaust system (46,47; Figure 9; column 17, line 55 - column 18, line 41),  
as claimed by claim 2

- ii. The gas-feeding apparatus (Figure 9; column 17, line 55 - column 18, line 41) according to claim 1, wherein the first section (9a-c; Figure 9; column 17, line 55 - column 18, line 41) and the second section (85a; Figure 9; column 17, line 55 - column 18, line 41) are each disposed parallel to the head surface (9; Figure 9; column 17, line 55 - column 18, line 41), said second section (85a; Figure 9; column 17, line 55 - column 18, line 41) being closer to the head surface (9; Figure 9; column 17, line 55 - column 18, line 41) than is the first section (9a-c; Figure 9; column 17, line 55 - column 18, line 41), wherein the second section (85a; Figure 9; column 17, line 55 - column 18, line 41) is coupled to the exhaust system (46,47; Figure 9; column 17, line 55 - column 18, line 41), as claimed by claim 3
- iii. The gas-feeding apparatus (Figure 9; column 17, line 55 - column 18, line 41) according to claim 1, wherein the first section (9a-c; Figure 9; column 17, line 55 - column 18, line 41) and the second section (85a; Figure 9; column 17, line 55 - column 18, line 41) are both coupled to the respective exhaust systems (46,47; Figure 9; column 17, line 55 - column 18, line 41), as claimed by claim 4
- iv. The gas-feeding apparatus (Figure 9; column 17, line 55 - column 18, line 41) according to claim 2, wherein the first section (9a-c; Figure 9; column 17, line 55 - column 18, line 41) reaches the head surface (9; Figure 9; column 17, line 55 - column 18, line 41) through the second section (85a; Figure 9; column 17, line 55 - column 18, line 41) without being communicated with each other, as claimed by claim 6



Art Unit: 1763

- v. The gas-feeding apparatus (Figure 9; column 17, line 55 - column 18, line 41) according to claim 6, wherein the first section (9a-c; Figure 9; column 17, line 55 - column 18, line 41) and the second section (85a; Figure 9; column 17, line 55 - column 18, line 41) are communicated with the head surface (9; Figure 9; column 17, line 55 - column 18, line 41) through a plurality of bores (87a, 86a; Figure 9), as claimed by claim 7
- vi. The gas-feeding apparatus (Figure 9; column 17, line 55 - column 18, line 41) according to claim 4, wherein the first section (9a-c; Figure 9; column 17, line 55 - column 18, line 41) and the second section (85a; Figure 9; column 17, line 55 - column 18, line 41) are each disposed parallel to the head surface (9; Figure 9; column 17, line 55 - column 18, line 41) and each separately communicated with the head surface (9; Figure 9; column 17, line 55 - column 18, line 41) through bores (87a, 86a; Figure 9), said second section (85a; Figure 9; column 17, line 55 - column 18, line 41) being closer to the head surface (9; Figure 9; column 17, line 55 - column 18, line 41) than is the first section (9a-c; Figure 9; column 17, line 55 - column 18, line 41), as claimed by claim 9
- vii. The gas-feeding apparatus (Figure 9; column 17, line 55 - column 18, line 41) according to claim 9, wherein the bores (87a, 86a; Figure 9) communicating the second section (85a; Figure 9; column 17, line 55 - column 18, line 41) and the head surface (9; Figure 9; column 17, line 55 - column 18, line 41) are disposed predominantly in a central area of the head surface (9; Figure 9; column 17, line 55 - column 18, line 41), whereas the bores (93b; Figure 9; column 17, line 55 - column 18, line 41) communicating the first section (9a-c; Figure 9; column 17, line 55 - column 18, line 41) and the head surface (9;

Art Unit: 1763

- Figure 9; column 17, line 55 - column 18, line 41) are uniformly distributed on the head surface (9; Figure 9; column 17, line 55 - column 18, line 41), as claimed by claim 10
- viii. The gas-feeding apparatus (Figure 9; column 17, line 55 - column 18, line 41) according to claim 10, wherein the second section (85a; Figure 9; column 17, line 55 - column 18, line 41) has a longitudinal shape in the gas-distribution head (9a-c, 85a; Figure 9; column 17, line 55 - column 18, line 41), as claimed by claim 11
- ix. The gas-feeding apparatus (Figure 9; column 17, line 55 - column 18, line 41) according to claim 2, wherein the first section (9a-c; Figure 9; column 17, line 55 - column 18, line 41) is coupled to a source gas line (86a; "process gas") and a purge gas line (87; "purge gas"), and the second section (85a; Figure 9; column 17, line 55 - column 18, line 41) is coupled to an additive gas line (86a; "process gas") and a purge gas line (87; "purge gas"), as claimed by claim 17. Applicant's claim requirements of gas identity does not further limit applicant's pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP 2111.02).
- x. A thin-film deposition apparatus (Figure 9; column 17, line 55 - column 18, line 41) comprising: an evacuable reaction chamber (8; Figure 9; column 17, line 55 - column

18, line 41) provided with a support (81; Figure 9; column 17, line 55 - column 18, line 41) for placing a substrate ("W"; Figure 9; column 17, line 55 - column 18, line 41) thereon; and the gas-feeding apparatus (Figure 9; column 17, line 55 - column 18, line 41) of claim 1, as claimed by claim 18

- xi. The thin-film deposition apparatus (Figure 9; column 17, line 55 - column 18, line 41) according to claim 18, wherein a space (8; Figure 9) between the head surface (9; Figure 9; column 17, line 55 - column 18, line 41) and the support (81; Figure 9; column 17, line 55 - column 18, line 41) is coupled to an exhaust system (46,47; Figure 9; column 17, line 55 - column 18, line 41), as claimed by claim 19
- xii. A gas-feeding apparatus (Figure 9; column 17, line 55 - column 18, line 41) adapted to be connected to an evacuable reaction chamber (8; Figure 9; column 17, line 55 - column 18, line 41) for atomic layer growth processing, comprising: a distribution plate (9; Figure 9); a first plate (9b; Figure 9) having first bores (93a; Figure 9) through which a first gas ("process gas"; Figure 9) passes, wherein a first section (Z1-Z4; Figure 9; column 17, line 55 - column 18, line 41) is formed between the distribution plate (9; Figure 9) and the first plate (9b; Figure 9), wherein the first gas ("process gas"; Figure 9) is introduced into the first section (Z1-Z4; Figure 9; column 17, line 55 - column 18, line 41) and passes through the first bores (93a; Figure 9); and a second plate (9c; Figure 9) having second bores (93b; Figure 9) through which a second gas ("purge gas"; Figure 9) passes, wherein a second section (94,95; Figure 9) is formed between the first plate (9b; Figure 9) and the second plate (9c; Figure 9), wherein the second gas ("purge gas"; Figure 9) is introduced into the second section (94,95; Figure 9) and passes through the

second bores (93b; Figure 9), said second plate (9c; Figure 9) having third bores (center 93b; Figure 9) through which the first gas ("process gas"; Figure 9) passes, wherein the second section (94,95; Figure 9) is provided with connectors (92; Figure 9) which connect the respective first bores (93a; Figure 9) and the respective third bores (center 93b; Figure 9) in the second section (94,95; Figure 9) without being communicated with the second bores (93b; Figure 9), wherein at least one of the first section (Z1-Z4; Figure 9; column 17, line 55 - column 18, line 41) or the second section (94,95; Figure 9) is coupled to an exhaust system (46,47; Figure 9; column 17, line 55 - column 18, line 41) which discharges the gas in the corresponding section without passing through the corresponding bores, as claimed by claim 30

- xiii. The gas-feeding apparatus (Figure 9; column 17, line 55 - column 18, line 41) according to claim 30, wherein the distribution plate (9; Figure 9) is provided with a first gas ("process gas"; Figure 9) inlet (86a) disposed in a central area of the distribution plate (9; Figure 9) for introducing the first gas ("process gas"; Figure 9) into the first section (Z1-Z4; Figure 9; column 17, line 55 - column 18, line 41), as claimed by claim 32
- xiv. The gas-feeding apparatus (Figure 9; column 17, line 55 - column 18, line 41) according to claim 30, wherein the second section (94,95; Figure 9) is provided with a second gas ("purge gas"; Figure 9) inlet (96) disposed in the vicinity of an outer periphery of the second section (94,95; Figure 9) , as claimed by claim 33
- xv. The gas-feeding apparatus (Figure 9; column 17, line 55 - column 18, line 41) according to claim 30, wherein the first section (Z1-Z4; Figure 9; column 17, line 55 - column 18, line 41) is coupled to the exhaust system (46,47; Figure 9; column 17, line 55 - column

18, line 41), wherein the first gas ("process gas"; Figure 9) present in the first section (Z1-Z4; Figure 9; column 17, line 55 - column 18, line 41) is exhausted around an outer periphery of the distribution plate (9; Figure 9), as claimed by claim 34

- xvi. The gas-feeding apparatus (Figure 9; column 17, line 55 - column 18, line 41) according to claim 30, wherein the second section (94,95; Figure 9) is coupled to the exhaust system (46,47; Figure 9; column 17, line 55 - column 18, line 41), wherein the second gas ("purge gas"; Figure 9) present in the second section (94,95; Figure 9) is exhausted through a second gas ("purge gas"; Figure 9) outlet (46, 47) disposed in the vicinity of an outer periphery of the second section (94,95; Figure 9), as claimed by claim 35
- xvii. The gas-feeding apparatus (Figure 9; column 17, line 55 - column 18, line 41) according to claim 30, wherein the second bores (93b; Figure 9) are disposed predominantly in a central area of the second plate (9c; Figure 9), as claimed by claim 36
- xviii. The gas-feeding apparatus (Figure 9; column 17, line 55 - column 18, line 41) according to claim 30, wherein the first bores (93a; Figure 9) are distributed uniformly on the first plate (9b; Figure 9), and the third bores (center 93b; Figure 9) are disposed right under the respective first bores (93a; Figure 9), as claimed by claim 37
- xix. The gas-feeding apparatus (Figure 9; column 17, line 55 - column 18, line 41) according to claim 36, wherein the second section (94,95; Figure 9) is coupled to the exhaust system (46,47; Figure 9; column 17, line 55 - column 18, line 41) and is provided with a second gas ("purge gas"; Figure 9) inlet (96) and a second gas ("purge gas"; Figure 9) outlet (46, 47) near an outer periphery of the second section (94,95; Figure 9), wherein

the second section (94,95; Figure 9) has a longitudinal shape from the inlet to the outlet via the central area having the second bores (93b; Figure 9), as claimed by claim 40

***Claim Rejections - 35 USC § 103***

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

17. Claims 5, 8, 12, 13, 20, 31, 38, and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okase; Wataru (US 5884009 A) in view of Hills; Graham W. et al. (US 5685914 A). Okase is discussed above. Okase does not teach:

- i. The gas-feeding apparatus (Figure 9; column 17, line 55 - column 18, line 41) according to claim 2, wherein the first section (9a-c; Figure 9; column 17, line 55 - column 18, line 41) has a volume which is larger than that of the second section (85a; Figure 9; column 17, line 55 - column 18, line 41), as claimed by claim 5
- ii. The gas-feeding apparatus (Figure 9; column 17, line 55 - column 18, line 41) according to claim 2, wherein the first section (9a-c; Figure 9; column 17, line 55 - column 18, line 41) comprises a central distribution inlet and a cone-shaped distribution plate extending radially therefrom, as claimed by claim 8
- iii. The gas-feeding apparatus (Figure 9; column 17, line 55 - column 18, line 41) according to claim 9, wherein the bores (87a, 86a; Figure 9) communicating the first section (9a-c; Figure 9; column 17, line 55 - column 18, line 41) and the head surface (9; Figure 9; column 17, line 55 - column 18, line 41) have a total opening area on the head surface (9;

Art Unit: 1763

- Figure 9; column 17, line 55 - column 18, line 41) which is larger than that of the bores (87a, 86a; Figure 9) communicating the second section (85a; Figure 9; column 17, line 55 - column 18, line 41) and the head surface (9; Figure 9; column 17, line 55 - column 18, line 41), as claimed by claim 12
- iv. The gas-feeding apparatus (Figure 9; column 17, line 55 - column 18, line 41) according to claim 9, wherein the bores (93b; Figure 9; column 17, line 55 - column 18, line 41) communicating the first section (9a-c; Figure 9; column 17, line 55 - column 18, line 41) and the head surface (9; Figure 9; column 17, line 55 - column 18, line 41) have an average bore size which is larger than that of the bores (86a) communicating the second section (85a; Figure 9; column 17, line 55 - column 18, line 41) and the head surface (9; Figure 9; column 17, line 55 - column 18, line 41), as claimed by claim 13
- v. The thin-film deposition apparatus (Figure 9; column 17, line 55 - column 18, line 41) according to claim 19, wherein the exhaust system (46,47; Figure 9; column 17, line 55 - column 18, line 41) for evacuating the gas-distribution head (9a-c, 85a; Figure 9; column 17, line 55 - column 18, line 41) and the exhaust system (46,47; Figure 9; column 17, line 55 - column 18, line 41) for evacuating the space (8; Figure 9) between the head surface (9; Figure 9; column 17, line 55 - column 18, line 41) and the support (81; Figure 9; column 17, line 55 - column 18, line 41) are connected and merged to a single exhaust line, as claimed by claim 20
- vi. The gas-feeding apparatus (Figure 9; column 17, line 55 - column 18, line 41) according to claim 30, wherein the first plate (9b; Figure 9) and the second plate (9c; Figure 9) are

Art Unit: 1763

disposed parallel to each other, and the distribution plate (9; Figure 9) has a cone shape, as claimed by claim 31

- vii. The gas-feeding apparatus (Figure 9; column 17, line 55 - column 18, line 41) according to claim 30, wherein the third bores (center 93b; Figure 9) have a total opening area which is larger than that of the second bores (93b; Figure 9), as claimed by claim 38
- viii. The gas-feeding apparatus (Figure 9; column 17, line 55 - column 18, line 41) according to claim 30, wherein the third bores (center 93b; Figure 9) have an average bore size which is larger than that of the second bores (93b; Figure 9), as claimed by claim 39

Hills teaches a wafer processing reactor (Figure 14) including a central distribution inlet (170) and a cone-shaped distribution plate (172) extending radially therefrom.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Hill's cone-shaped distribution plate to Okase's apparatus and to optimize the relative dimensions of Okase's apparatus.

Motivation to add Hill's cone-shaped distribution plate to Okase's apparatus is for confining reactant gases (column 2; lines 45-50) and to optimize the relative dimensions of Okase's apparatus. It is well established that changes in apparatus dimensions are within the level of ordinary skill in the art. (Gardner v. TEC Systems, Inc., 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984); In re Rose, 220 F.2d 459, 105 USPQ 237 (CCPA 1955); In re Rinehart, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); See MPEP 2144.04).



Art Unit: 1763

18. Claims 14, 15, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okase; Wataru (US 5884009 A) in view of Salimian; Siamak et al. (US 5656123 A). Okase is discussed above. Okase does not teach:

- i. The gas-feeding apparatus (Figure 9; column 17, line 55 - column 18, line 41) according to claim 2, further comprising an RF power source for exerting RF power exclusively onto an interior of the second section (85a; Figure 9; column 17, line 55 - column 18, line 41), as claimed by claim 14
- ii. The gas-feeding apparatus (Figure 9; column 17, line 55 - column 18, line 41) according to claim 14, wherein the RF power source is coupled to a bottom plate of the first section (9a-c; Figure 9; column 17, line 55 - column 18, line 41) which physically separates and insulates the first section (9a-c; Figure 9; column 17, line 55 - column 18, line 41) from the second section (85a; Figure 9; column 17, line 55 - column 18, line 41), and the head surface (9; Figure 9; column 17, line 55 - column 18, line 41) is grounded, as claimed by claim 15
- iii. The gas-feeding apparatus (Figure 9; column 17, line 55 - column 18, line 41) according to claim 1, further comprising an RF power source coupled to the gas-distribution head (9a-c, 85a; Figure 9; column 17, line 55 - column 18, line 41) to exert PR power onto an interior of the reaction chamber (8; Figure 9; column 17, line 55 - column 18, line 41), as claimed by claim 16

Salimian teaches RF powered (12, 16; Figure 1) electrodes (34, 46) for plasma processing.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Salimian's RF power source to Okase's apparatus.

Art Unit: 1763

Motivation to add Salimian's RF power source to Okase's apparatus is for conducting plasma-enhanced processing substrates as taught by Salimian (column 1; lines 6-19).

***Conclusion***

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (571) 272.1442. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official fax phone number for the 1763 art unit is (703) 872-9306. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (571) 272-1700. If the examiner can not be reached please contact the examiner's supervisor, Parviz Hassanzadeh, at (571) 272-1435.

A handwritten signature in black ink, appearing to read 'Rudy Zervigon', with the date '12/8/15' written below it.